VOLUME OVERLOAD AT DISCHARGE MEASURED USING BIOELECTRICAL IMPEDANCE VECTOR ANALYSIS PREDICTS OUTCOME IN PATIENTS HOSPITALIZED WITH ACUTE DECOMPENSATED HEART FAILURE

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Authors: Bryan Dieffenbach, Carolyn Haunschild, Benjamin Kipper, Navaid Iqbal, Yang Xue, Alan Maisel, Veterans Affairs Medical Center, La Jolla, CA, USA

Background: Recent studies have shown that nearly half of patients with acute decompensated heart failure (ADHF) are discharged with unresolved volume overload. To date, clinical assessment and serum measurement of B-type Natriuretic Peptide (BNP) are the primary means for gauging disease status in ADHF patients. The limitations of these tests in accurately assessing volume status may be contributing factors to the high readmission rates for heart failure patients. Bioelectrical impedance vector analysis (BIVA) provides a quick, inexpensive and noninvasive method for objectively evaluating total body hydration at the bedside.

Methods: Patients were enrolled prospectively from a single-center to evaluate the prognostic utility of BIVA. BIVA was used to take serial measurements of hydration status in 45 patients admitted for ADHF. Patients were followed for 90 days after discharge for evaluation of the following primary endpoints: acute decompensation as diagnosed by the emergency department, hospital readmission for ADHF and/or all-cause mortality.

Results: BIVA hydration analysis adds to the predictive power of BNP (Area under the curve of 0.780 vs. 0.848). Optimal cutpoint values of 77.2% by BIVA and BNP >640 pg/mL at discharge were determined using the Youden Index. Patients with BIVA hydration above the specified cutpoint (hyperhydration) at the time of discharge were more likely to have a diagnosed cardiac event within 90 days (HR = 10.772, p=0.04). Patients with an elevated BIVA hydration status above the cutpoint and a serum BNP above 640 pg/ml at discharge were at significantly increased risk for a cardiac event within 90 days (HR = 38.904, p = 0.001).

Conclusions: Elevated BIVA hydration status at discharge is predictive of adverse events within 90 days while BIVA hydration values below the cutpoint were associated with a lower risk of adverse events after discharge. When considered along with BNP values, BIVA enhances the prognostic power of BNP in patients hospitalized with ADHF. These results suggest that the bedside measurement of hydration status with BIVA can help identify patients at high risk for adverse events after hospital discharge.